AS-210

I. INTRODUCTION

A. THE CLEAR-COM CONCEPT

Clear-Com is a closed-circuit intercom system that provides high-intelligibility, two-way communications in high- or low-noise environments. A basic intercom system contains a one- or multi-channel Main Station interconnected with various remote headset and speaker stations.

Clear-Com manufactures a wide variety of portable, rack-mount, and custom-mount intercoms. All are compatible, allowing systems to be set up according to specific needs. The Clear-Com System interfaces with virtually any other type of communications systems (call Clear-Com or see your dealer for info).

Clear-Com Stations normally interconnect with standard, 2-conductor shielded microphone cable; they include inputs for XLR-type, 3-pin connectors. One wire in the mic cable carries DC power (28-30 volts) from the Main Station to the remote stations, and the other wire carries the audio signal. The shield acts as common ground. Audio termination is required at only one point in the intercom system, and is usually provided by the Main Station or Power Supply.

Clear-Com is a "distributed amplifier system:" each main and remote station contains its own mic preamplifier, power amplifier (for headset or speaker), and signalling circuitry. Every intercom has Automatic Headset Detection, a circuit that shuts off the mic preamp when the mic or headset is not connected, so background noise is not increased by an unused but on-line (connected) station. Low-impedance mic input lines (200 ohms) and specially designed circuitry make Clear-Com channels virtually immune to RF and dimmer noise.

Clear-Com Main Stations, Power Supplies, and some Remote Stations provide an auxiliary program input with its own volume control, which allows the station operator to monitor external audio.

Visual Signal Circuitry, a standard feature on most stations, allows the user to attract the attention of operators who have removed their headsets or turned off their speakers.

Depending upon the type of Main and Remote Stations selected, a maximum amount of Remote Stations from 12 (speaker) to 100 (headset) can be connected along one mile of wire. Remote Stations bridge the intercom line at a very high impedance, and place a minimum load on the line. Audio level remains constant, never fluctuating even when stations leave or join the line.

The regulated DC voltage provided by Main Stations and Power Supplies enables remote stations to operate; they run at minimal current (10 milliamperes quiescent for headset stations, 20 ma quiescent for speaker stations) while generating extremely loud listen volumes (greater than 110 dB SPL). The higher voltage and low current keep voltage losses to a minimum in long lines. If the voltage drops due to the addition of cable or many stations, Clear-Com equipment continues operating normally with less than 12 volts available.

breaker pops out and the adjacent red LED illuminates. Removing the short, then pressing the circuit-breaker button automatically resets the system.

The CS-210 provides audio termination for the intercom system.

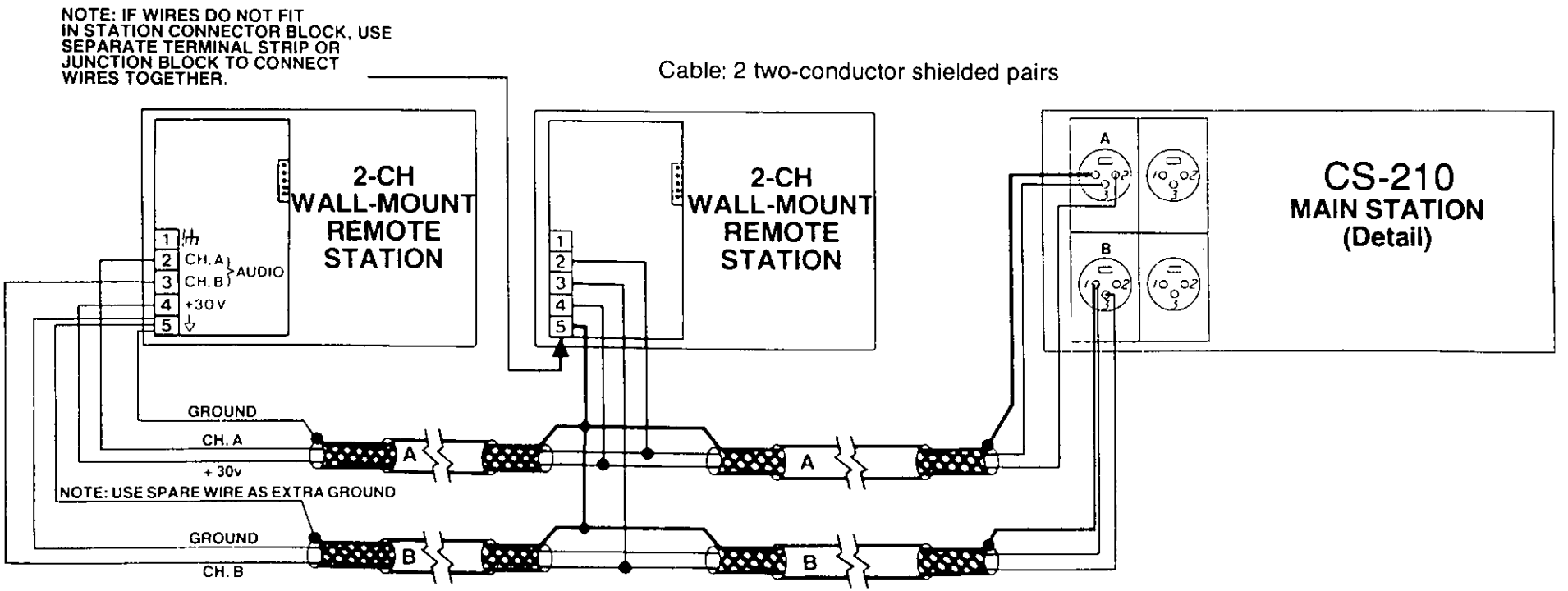
The CS-210 can be ganged together with other CS-210's for multiple two-channel systems and back-up power support. The unit is lightweight, weather-resistant, and assembled with a sturdy plastic carrying strap on top and four protective rubber feet on the bottom of its weather-resistant enclosure.

Easy Interconnection

The CS-210 provides three 3-pin, male XLR outputs for output of Channel A (connectors are wired in parallel) and three of the same for Channel B output. Intercom signals are fed from the CS-210 with standard mic cable; see next section.

The CS-210 is available with a rack-mount kit for adapting it to standard 19" equipment racks. The Clear-Com part number for the CS-210 Rack-Ear Kit is 820020.

FIXED INSTALLATION WIRING
(TWO-CHANNEL)



II. SYSTEM INTERCONNECTION

A. INPUTS & OUTPUTS: WHAT CABLE TO USE

Intercom Output to the System

Each intercom channel is output from the CS-210 on standard two-conductor mic cable. The cable is routed from the 3-pin male XLR connectors on the CS-210 rear panel to the 3-pin female XLR input connectors on the Remote Stations. One cable wire carries DC power and the other wire carries the intercom signal; the shield acts as circuit ground.

The pin assignments on ALL 3-pin XLR intercom connectors (male and female) are:

PIN 1-- COMMON
PIN 2-- + VDC
PIN 3-- INTERCOM AUDIO (Channel A or B)

Choosing Cable

The CS-210 provides three output connectors for each channel, so each channel can be routed separately (in individual mic cables) or combined from one Channel A output and one Channel B output onto multi-pair cable. The latter is most convenient when connecting to the input terminal strips of Clear-Com's wall- or custom-mount two-channel stations (such as KB-111A or MR-102A).

These methods, of course, can be combined in the same system.

When choosing interconnecting cable, keep the following considerations in mind:

1) DC resistance affects crosstalk. In permanent installations, do not use wire smaller than 20 gauge, stranded (except runs shorter than 100 feet). Keep the total resistance under 100 ohms.

2) The capacitance of the interconnecting cable affects the frequency response and sidetone stability. Total capacitance should not be greater than .25 microfarads (capacitance between conductor and shield; equivalent to an intercom network containing 5000 feet of 50 pF per foot of cable).

3) Clear-Com Systems operate with cable that has no more than 50 pF from conductor to conductor, and no more than 70 pF from conductor to shield.

PORTABLE INSTALLATION CABLE

Typical cable for connecting the CS-210 to the Remote Stations is rubber-jacketed, two-conductor, shielded microphone cable. We suggest you try:
BELDEN 8413 (24 gauge, stranded) for intercom lines up to 500 feet in length, and

BELDEN 8412 (20 gauge, stranded) for lines up to 5000 feet.*

(continued)

SYSTEM INTERCONNECTION, CONTINUED

Portable Interconnection Methods

Portable Remote Stations each have a pair of input and output connectors which are wired in parallel, allowing you to set up a "daisy-chain" when installating the system. A diagram in this section illustrates the daisy-chain method. As an alternative, Clear-Com's Model QP-100 "Quadropuss Line-Splitter" is a small interconnect device that accepts one cable input and provides three outputs. Both the daisy-chain and line-splitting methods lessen the cable needed and simplify the installation process.

PERMANENT INSTALLATION CABLE

To install wall-mount and custom-mount remote stations, we recommend you use vinyl-insulated and jacketed cable; it costs less and is easier to pull through conduit than the rubber-insulated cable. Use low capacitance cable. We suggest you try:
BELDEN 8762 (20 gauge, stranded) for applications up to 500 feet, and
BELDEN 8760 (18 gauge, stranded) for up to 5000 feet.*

If conduit is available when installing permanent Remote Stations, run interconnect cable through the conduits to each wall-mounted unit.

NOTE: "Signal ground" (Pin 1 on intercom connectors) and "chassis ground" are NOT the same point. Do NOT connect Pin 1 and the chassis together. The chassis is insulated from the signal ground with a capacitor (.01 microfarad, 1.4kv). This eliminates the hum and potential shock hazards that can arise if stations are at a different ground potential.

In installations where conduit is NOT used, and equipment doesn't share a common ground, it is good engineering practice to run an additional ground wire to tie all chasses together (this decreases susceptibility to electrical noise fields).

*If you choose not to use Belden cable, use an equivalent type with similar wire gauge and capacitance. Cable, especially in longer runs, should have low DC resistance (less than 15 ohms per 1000 feet; large diameter conductors) and low interconductor capacitance (less than or equal to 50 pF per foot of cable: capacitance between conductor and shield).

Multi-Channel Cable Considerations

When installing a system that includes two-channel (or more) stations, each channel may be routed individually to the remote station with separate mic cables, OR two channels may be routed together with two-pair, individually-shielded cable (Belden 8723).

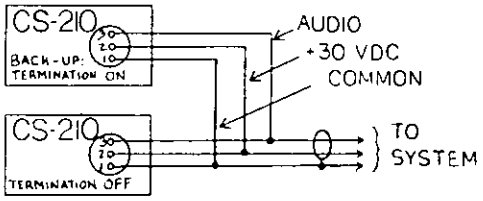
Crosstalk

When multiple channels are fed to remote stations, the amount of crosstalk is proportional to the amount of DC resistance in the ground return. Two ohms of resistance or less is ideal; 2 ohms will give you 40 dB of isolation. Anything greater than 2 ohms will increase crosstalk. Each channel must be fed in its own separate shield. Tie any unused wires in the interconnect cable to ground (Pin 1), thereby further improving the crosstalk.

Before you install the system, consider the following pointers to help determine how to configure the intercom connections.

Multiple Power Sources:

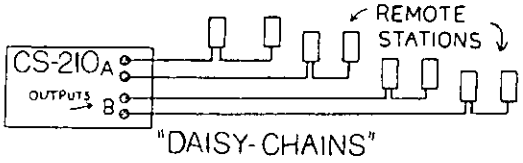
Clear-Com Main Stations and Power Supplies can be paralleled together in an intercom system; having an extra source provides increased current capability (you can add more stations to the mile of cable) and a back-up power supply. If using two sources of DC power, termination for the system must occur in one source only; the termination switch(es) should be ON in one Main Station and OFF in the other. See diagram.



DUEL-POWER SET-UP DOUBLES SYSTEM CAPACITY & PROVIDES BACK-UP POWER

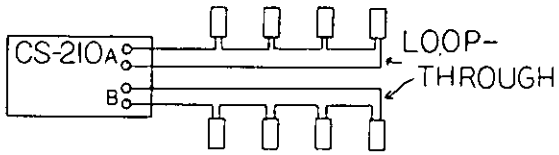
Loop-Through Method:

The common method to interconnect stations is with a daisy-chain, as shown here (using one channel):



"DAISY-CHAINS"

This works well, but if the line were broken anywhere along the feed, all communicating would stop. An alternative (shown below) solves a potential problem by using TWO Channel A (or B, etc) output connectors for one stretch of cable. If the line were cut at one point, activity on the channel continues.



Signalling Configurations in Multi-Channel Systems:

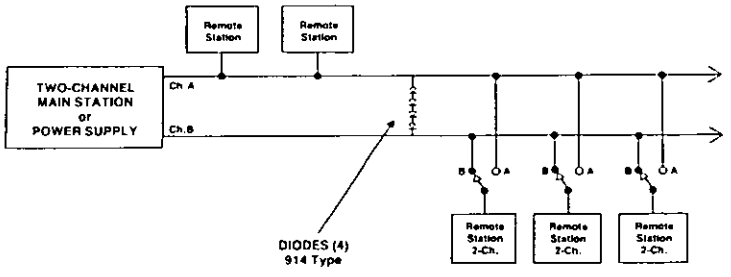
In normal circumstances, the Call light on a two-channel selectable remote station (which communicates on one channel at a time) illuminates only when someone sends a signal on the channel currently being used by that station, not the other. This is because the Call signal travels on the intercom audio line (in the form of DC voltage).

However, you can MODIFY the two-channel cable that is input to multi-channel stations (KB-111A, RM-120A, MR-102A) so that, no matter what channel that group of stations is using, their Call lights will go on when either Channel A stations or Channel B stations send a signal.

The diagram below shows a group of two-channel stations talking on Channel B who want to receive call signals from stations using Channel A (this is one-way signalling Channel B cannot send a signal to Channel A).

This is accomplished by placing four diodes (914-type) in series on the two-channel intercom line as shown. The call signal follows the direction of the diodes. Call signalling is now possible from "A" stations to "B" stations.

ALTERNATIVE SIGNALLING



B. THE CS-210 MAIN STATION

The CS-210 is a portable, two-channel main station with a regulated power supply and a versatile monitoring system. It features excellent speech intelligibility in all noise-levels.

The CS-210 contains a mic preamp with a limiter and can support two dynamic headsets/handsets. The headset output connector labelled "headset 1" is switchable, with is a toggle switch that sets the "mic on" "mic off" and "momentary mic on '(on)'." The CS-210's four-watt power amp can drive a standard Clear-Com headset to levels greater than 110 dB SPL.

Monitoring System

The CS-210 provides DC voltage and the ability to talk & listen on two separate channels. It supports and monitors two intercom lines containing as many as 60 remote headset or 12 remote speaker stations.

The CS-210 operator monitors the intercom channels by pressing the locking "Monitor Select" buttons (one for Channel A, one for Channel B). These buttons light dimly when engaged. Either channel may be monitored separately, or both simultaneously (without tying the two channels together). The CS-210 controls the headset listen level of channel activity with a Volume knob on the front panel.

Stage Announce (Paging)

On its rear panel, the CS-210 provides an output (line-level, balanced) from the mic preamp. The "Stage Announce" button on the front panel activates this output, allowing the CS-210 operator to speak into the mic or handset and obtain access to an external speaker/amp system. The Stage Announce button also mutes the operator's voice output to the intercom channels.

Call Signalling

Visual "Call" Signalling attracts the attention of people who have removed their headsets or turned off their speakers. The CS-210 front panel provides a "Call" button. Pressing it signals the stations on any channel whose "Monitor Select" button is engaged and illuminated.

When a remote station sends a Call signal, the lamp in the Monitor Select button associated with that station's channel lights brightly, whether or not the Monitor is "on."

Program Input

The CS-210 accepts a balanced, mic-level OR line-level program input which can be monitored in the headset(s). The external program is assignable to either or both channels, and mixes with the intercom signal. Program volume for the operator's headset is adjustable with a knob on the front panel.

Sidetone

The Sidetone Adjust control on the front panel allows the CS-210 operator to vary the level of his/her own voice as heard in the headset; lowering the amount of sidetone helps suppress acoustic feedback when using the CS-210 with an external speaker and a gooseneck mic.

Power Supply Protection

The CS-210 power supply is regulated, current-limited, and provides 30 volts DC at one ampere from a 115V or 230V (switch-selectable) AC mains supply. The CS-210 has a circuit breaker to protect the system from miswired cable or shorts in the lines. If a short occurs, the front panel circuit

continued

B. INTERCONNECTION SET-UP

After determining system configuration and channel assignment, pick a location for the CS-210; it can be anywhere as long as it is provided with a source of 105-125 VAC, 50-60 Hz (power consumption is 60 watts maximum).

1) Use standard shielded mic cable (see previous section). ALWAYS AVOID BENDS IN THE CABLING; allow at least 3" behind rack-mount units for cable extending from rear panels.

2) Route all cables from the Main Station to the Remote Stations. Pin assignments on ALL 3-pin intercom connectors are:
   PIN 1-- common
   PIN 2-- +30 volts DC
   PIN 3-- intercom audio

3) Route cables away from heavy AC power sources, such as lighting panels, electric motors, or power transformers.

4) In permanent installations, BE SURE TO INSTALL THE SYSTEM IN ACCORDANCE WITH APPROVED LOCAL BUILDING CODE.

5) If program monitoring is required, input the external signal to the 3-pin female connector on the CS-210 rear panel. The station operator hears the program in the headset, mixed with the intercom activity. The program pre-amp's gain is switch-selectable (on rear panel) for either mic level (-75dBv nominal input signal) or line-level (-15dBv nominal). The input must be balanced 300k ohms in line position, 3-6k ohms in mic position.

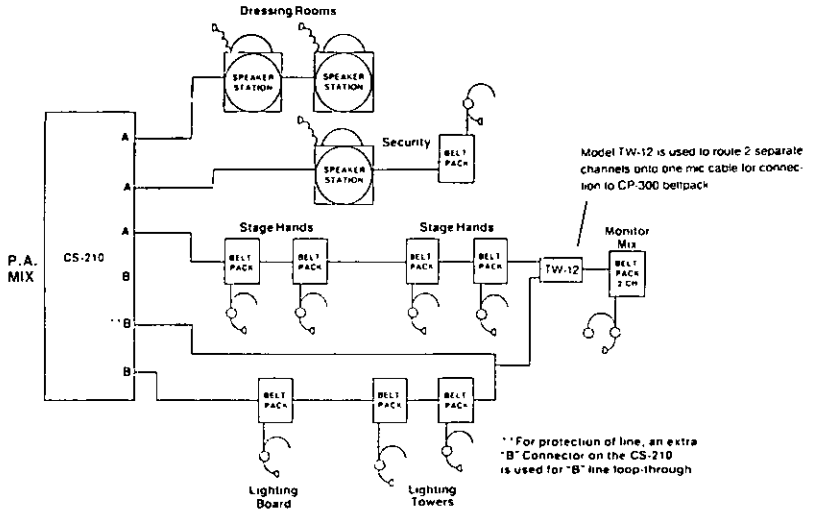
6) Turn on power switch (it should illuminate), plug in headset(s) and set Intercom, Program, and Sidetone levels.

   NOTE about HEADSETS AND MICS: The CS-210 headset connectors (like all Clear-Com dynamic headset connectors) are 4-pin, male XLR. The connector labelled "Headset 1" works with the Mic On/Off/(Momentary On) toggle switch above it. The headset connector pin-out assignment is:
   PIN 1--mic common
   PIN 2--mic hot
   PIN 3--headphone common
   PIN 4--headphone hot

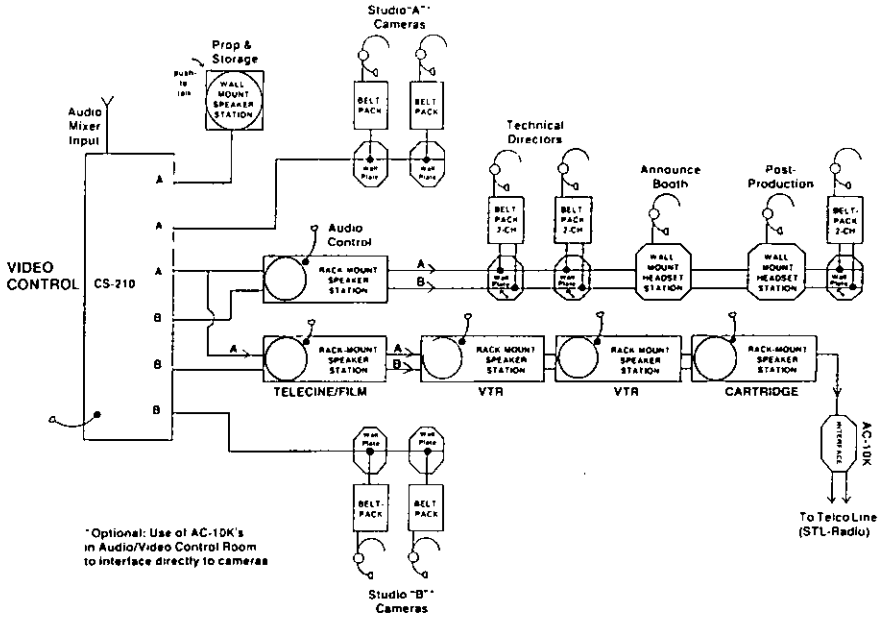
   DO NOT place the headset(s) within two feet of an AC power transformer or the mic(s) will pick up a hum.
   To meet optimum performance specs, the the headsets used (handsets, mics, etc) should have the following characteristics:

Microphone type:	dynamic
Impedance:	150-250 ohms
Output Level:	-55 dB
Headphone Type:	dynamic
Output Impedance:	300-2000 ohms

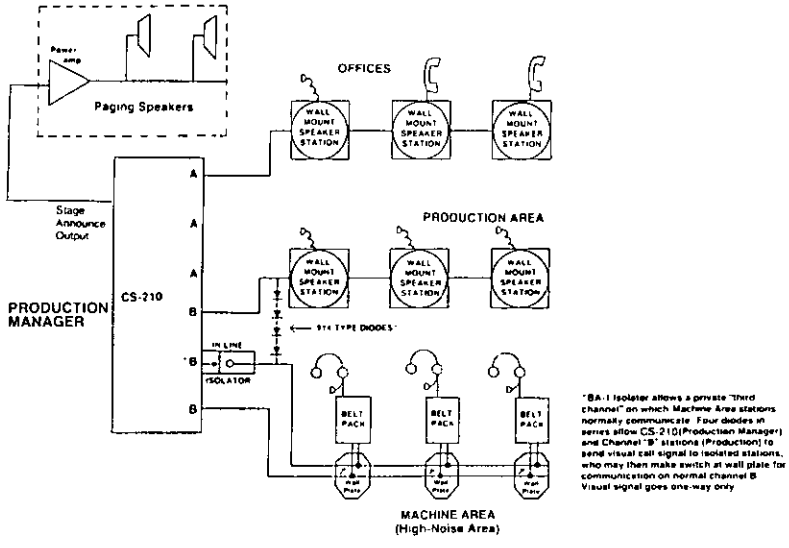
The system should now be ready to run!



TOURING INTERCOM SYSTEM
(Portable)



TELEVISION INTERCOM SYSTEM



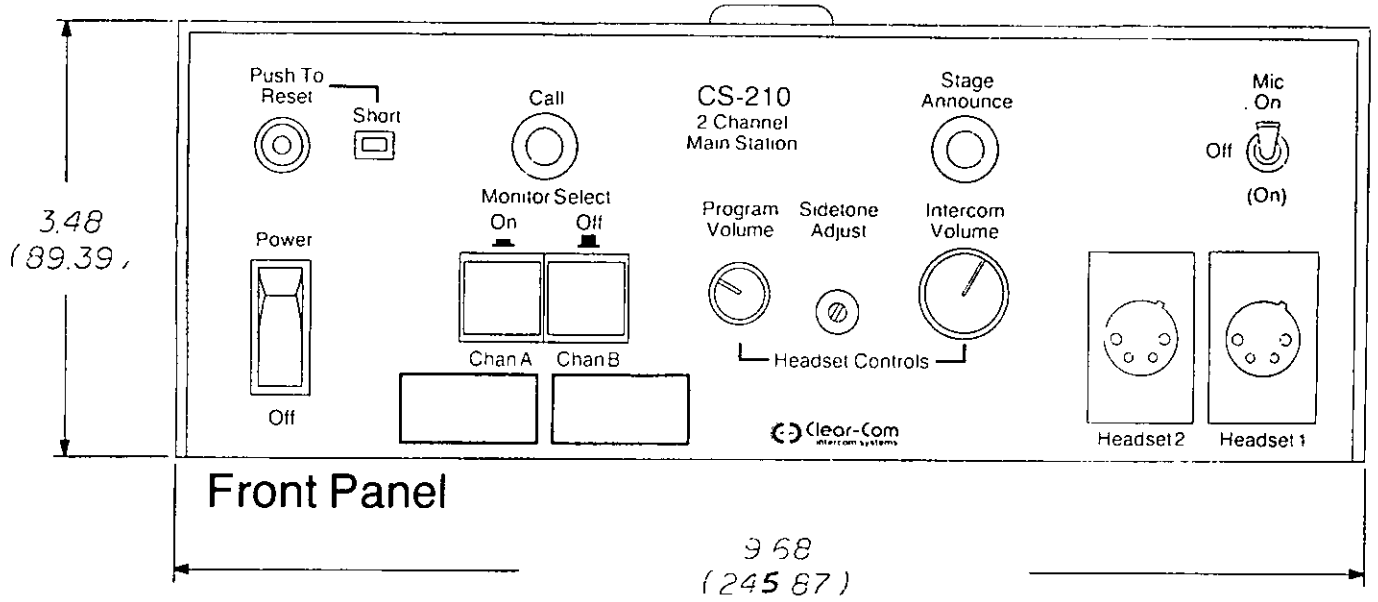
FACTORY INTERCOM SYSTEM

"Typical" Intercom Systems

III. OPERATION OF THE CS-210 MAIN STATION

A. Front Panel Controls and Connectors

The CS-210 controls and connectors are described below, in the order they appear on the CS-210 front panel from left to right.



PUSH-TO-RESET POWER SHORT BUTTON & SHORT INDICATOR

Next to the circuit breaker reset button is a red lamp that glows when the breaker pops, indicating the presence of a short circuit in the wiring or in a station, or a phase reversal in cabling. After identifying and correcting the problem, press the reset button and the system is ready to run.

MONITOR SELECT BUTTONS

The CS-210 operator chooses which channel(s) to monitor with the locking "Monitor Select" buttons, which light dimly when activated.

Pressing the Monitor button for Channel A or B allows the CS-210 operator (using a headset/handset plugged into the unit's front panel) to talk and listen to all stations using that channel (i.e., connected to the related outputs from the CS-210 rear panel). The monitoring buttons let you monitor each channel separately or both at once without tying them together.

The Monitor Select buttons function during call signalling. A Monitor Select button (whether on or off) lights brightly when a station on the associated channel sends a Call signal.

Use a grease pencil in the space provided below each Monitor Select button to write the channel functions or to identify stations on each channel (e.g., Channel A: Dressing Rooms; Channel B: Lighting Crew).

CALL (Visual Call Signalling)

Pressing the **CALL** button activates the Visual Signal circuit in the intercom system, allowing you to attract the attention of other operators who have removed their headsets or turned off their speakers (the call signal also activates the remote page function at designated remote stations).

The Call button signals all stations on the channel selected for monitoring. If the Monitor Select button for Channel A is "on," pressing Call will signal all stations on Channel A only. If both Monitor buttons are on, pressing Call causes the lamps at all stations to light.

When a remote station activates the signal circuit, the CS-210 Monitor Select button for the station's channel will light brightly (whether on or off).

PROGRAM VOLUME

The "**Program Volume**" knob controls program level for the CS-210 headset(s) AND for the intercom system. For information about signal input, see next section ("Rear Panel Controls and Connectors").

The CS-210 internal electronics contain jumpers that are factory-set to send program to the CS-210 headset(s) and the intercom system.

The CS-210 operator decides whether one or both channels receive the program by setting the channel-select switch on the station's rear panel.

SIDETONE ADJUST

The "**Sidetone Adjust**" knob controls the overall volume level of the operator's voice as he/she hears it in the headset, and simultaneously prevents feedback when the CS-210 is connected to an external speaker. It does not affect the level of the operator's voice going to other stations, or the level of any incoming signals. Sidetone level needs to be set just once (if at all), even when stations join or leave the system.

INTERCOM VOLUME

This knob adjusts the overall volume of intercom activity heard by the CS-210 operator(s).

STAGE ANNOUNCE

The "**Stage Announce**" function lets the CS-210 operator make announcements via an external speaker/amp system. For these paging applications, the CS-210 provides a balanced, line-level (0 dB) output signal to the Stage Announce connector (3-pin male XLR) on the rear panel. The front panel pushbutton activates this output and simultaneously mutes the operator's voice to the intercom channels.

HEADSET CONNECTORS;
MIC ON/OFF/(ON) SWITCH

There are two dynamic headset connectors on the CS-210 front panel; the one labelled Headset 1 is associated with the Mic On/Off/(Momentary On) toggle switch above it.

When there is no input to either headset connector, the CS-210's mic preamplifier shuts off automatically. This eliminates any noise pick-up at the unused input.

The headset connector pin-out assignment is:

PIN 1--mic common
PIN 2--mic hot
PIN 3--headphone common
PIN 4--headphone hot

When operating the system, DO NOT place the headset(s) within two feet of an AC power transformer or the mic(s) will pick up a hum.

OTHER OPERATIONAL CONSIDERATIONS

Termination

One audio termination per channel is required, and the CS-210 is set up with internal jumpers to provide that termination (that is, if it is the only power-supplying station in the system).

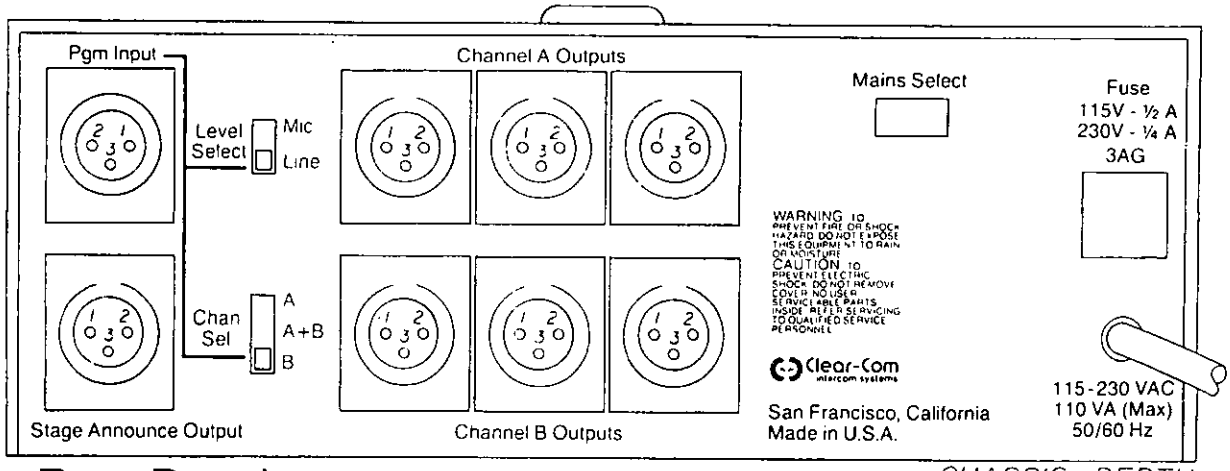
The intercom line terminations are removable resistors, appropriately marked on the printed circuit board. They can be pulled to allow the CS-210 to operate as a "remote" station if another power supply is connected to the system. If your system does include a second CS-210 or other Main Station or Power Supply, system termination is provided by just ONE source. The termination switches in all Power Supplies/ Main Stations must be "off" except at one "master" location. (Do not attempt to remove jumpers without the proper test equipment and knowledge of electronic adjustment procedures.)

Unconnected Channel Inputs/Outputs

If your system includes a multi-channel station that has one or more of its channels not physically connected (e.g., empty input connector), the unconnected channel(s) MUST be terminated at that station (THIS APPLIES TO ALL STATIONS: MAIN, REMOTE, OR POWER SUPPLY).

Rear Panel Controls and Connectors

The CS-210 controls and connectors are described below, in the order they appear on the CS-210 rear panel from left to right.



Rear Panel

CHASSIS DEPTH
10.75
(273.05)

PGM INPUT

3-pin female XLR connector; pin-out assignment is:
Pin 1--ground
Pin 2--input
Pin 3--input

An auxiliary program input and level-select switch are located on the CS-210 rear panel. The CS-210 accepts a balanced or unbalanced input, either mic-level or line-level input (level-select switch is on rear panel). The CS-210 operator can monitor program along with intercom activity in the the headset(s) and mix program with the intercom signal on one or both channels.

The input impedance is 300k ohms in the line position, 3.6k ohms in the mic position. A -20 dBv nominal signal (line-level input) drives the line to full output (-50 dBv nominal for mic-level). If inputting a balanced signal, apply it to Pins 2 and 3. If inputting an unbalanced signal, ground Pin 2 or Pin 3 and apply the signal to the other input pin.

STAGE ANNOUNCE OUTPUT

3-pin male XLR connector; pin-out assignment is:
Pin 1--ground
Pin 2--output
Pin 3--output

LEVEL SELECT

Slide-switch; choose mic-level or line-level depending upon which type of signal is input to the program connector.

CHAN SEL (A/A+B/B)

Slide-switch; choose which channel(s) will receive program input to monitor: either Channel A only, both A and B, or Channel B only.

CHANNEL A & B OUTPUTS

3-pin male XLR connectors; pin-out assignment is:
Pin 1-- ground
Pin 2-- DC voltage
Pin 3-- intercom audio (channel A or B)

MAINS SELECT

Slide-switch; choose 115V or 230V depending on source of AC power. The CS-210 is set up with a fuse for operation from 115VAC; you must change the fuse from 1/2 amp value to 1/4 amp (slow-blow) if operation from 230VAC is required.

C. Warranty and Maintenance

Your Clear-Com System contains modular, solid-state equipment that allows system expansion and field servicability. Efficient ventilation is inherent in chassis design. Rugged packaging guards against abuse; the chassis are 16 gauge alumninum or stainless steel, with double-sided, glass epoxy, plug-in PC boards. Our conservatively-engineered circuitry assures the longest component life. We shield heavily against hum, RFI pick-up, and solid-state dimmer noise.

Before shipping, we test each unit individually to ensure that it meets or exceeds all specifications. All units are guaranteed by Clear-Com against defects in materials and workmanship for one year following date of purchase (90 days for headsets--see warranty card enclosed with each unit).

Our Engineering and Service Departments will gladly give you technical advice and assistance. If you have any questions regarding operation, modifications, or applications of your intercom system, call us between 9 and 5 at 415-861-6666 (Pacific Standard Time).

IV. TROUBLESHOOTING

Symptom	Cause	Remedy
System is non-operable; power switch is not illuminated	a. Loss of AC power	a. Plug unit into dependable AC source
	b. Internal fuse is blown; could be caused by power supply failure.	b. Replace fuse; if it blows repeatedly, bridge rectifier or other component probably shorted inside power supply. Have power supply fixed.
Circuit breaker trips repeatedly; short circuit LED remains lit	a. Shorted or mis-wired interconnect cable	a. Remove cables, one at a time, from Main Station until faulty line is located. Check for shorts between Pins 1 and 2.
	b. Defective remote unit	b. Check remote unit.
Hum or buzz in system	a. Inductive pick-up caused by close proximity of Main or Remote Station to power lines or transformers.	a. Relocate offending unit.
structions.		
	c. 10 ohm chassis ground resistor (R14) in power supply is open*	c. Check resistance between chassis and Pin 1 of connector, make sure it's ten ohms. If not,open power supply and replace resistor.
	d. inductive pick-up by headset mic; check by switching mic on and off	d. Move mic away from "hum field" or use carbon or electret headset.
Excessive background noise pick-up by mic	a. distance from mic to lips is too far	a. Move away from mic
	b. volume too high	b. Lower headset/ speaker volume
	c. too many mics "on" in entire system	c. Turn off all unused mics

(continued)

Symptom	Cause	Remedy
System Feedback	Acoustical	a. Check sidetone levels b. Check termination c. Volume too high at one station d. Two or more speaker stations have mics on simultaneously; speak one at a time (per channel)

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* Power Supply's 10-ohm resistor is opened when the system ground comes in contact with something "hot," with respect to the Main Station Earth Ground. Should this occur, we recommend you carefully check the system ground and AC distribution in the area. NOTE: THIS IS A POTENTIALLY DANGEROUS SITUATION; IF IT OCCURS, A SHOCK HAZARD MAY OCCUR BETWEEN METAL BOOM OF HEADSET AND GROUND.

V. CS-210 SPECIFICATIONS

AMPLIFIER DESIGN:
IC amplifiers including solid-state switching and signalling circuits. Current-limited and short-circuit protected.

MICROPHONE PRE-AMP:
Input: Low impedance (1k ohm) for 200 ohm nominal dynamic elements
Input Level: -55 dBv nominal, -10 dBv max. before clipping*
Nominal Gain: +37 dB
Freq. Response: 250 Hz-12kHz with a contoured response to enhance voice intelligibility
Gain Adjust: ±5 dB
Limiter Range: 25 dB

HEADPHONE AMPLIFIER:
Drives any load of at least 150 ohms to full output (+18 dBv)
Distortion: <0.2% THD at 1kHz
Gain from intercom line: +37 dB max
Frequency Response: 150-18kHz ±2 dB

PROGRAM AMPLIFIER:
Gain, input to intercom line, max.: +49 dB (mic), -1 dB (line)(the gain to headset output is a max. of 37 dB more than to intercom line)
Frequency Response: 150-18k Hz
Input Impedance: 3.6k balanced (mic), 300k ohms balanced (line)
Input Level: -75 dBv nominal (mic), -15 dBv nominal (line), max. before clipping; Volume full on, -52 dBv (mic), +3 dBv (line)

POWER SUPPLY:
Output Voltage: 30 VDC, regulated
Output Current: 1 amp max.
Channel Separation: >50 dB
Signal-to-Noise: >55 dB

OPERATING CONDITIONS
Channel Monitoring: Push-button-selectable A, B, or both
Call Circuitry: Receives a signal from remote stations whether or not channel is monitored. The Call button sends a signal only on channel(s) being monitored.
Capacity: Will support up to 60 headset stations or 12 speaker stations.
System Impedance: 200 ohms, internally terminated (jumper-removeable)
System Level: -18 dBv nominal; 0 db before clipping*
Signalling: Call Light Sensitivity--4 VDC max.; Call Voltage--11 VDC min.
Stage Announce: balanced, line-level (0 dBv) transformer-isolated 600 ohm output from mic pre-amp

CONNECTORS
Headset: (2) XLR 4-pin male
Channel Outputs: (6) XLR 3-pin male
Stage Announce: (1) XLR 3-pin male
Program Input: (1) XLR 3-pin female
Ext. Speaker: 1/4" mono phone jack

POWER REQUIREMENTS
105-125 or 210-250 VAC; 50-60 Hz, switch-selectable from rear panel; 60 watts max.

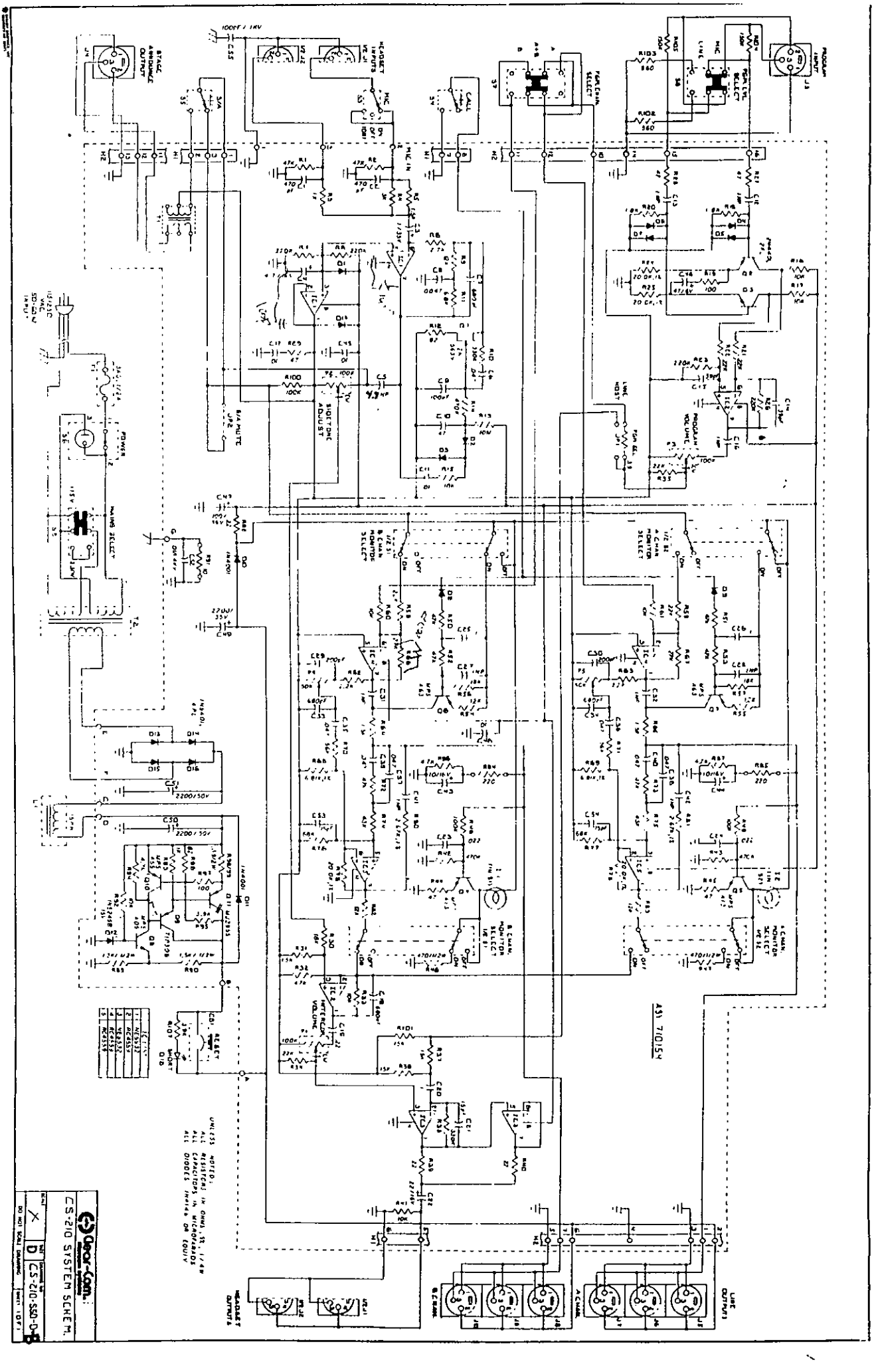
DIMENSIONS
3-1/2" H x 9-11/16" W x 11-11/16" D (front to back) (89 mm x 254mm x 305mm)

ENVIRONMENTAL TOLERANCE
0-50 degrees C (32-122 degrees F)

* 0 dBv is referenced to 0.775 volts RMS.

CS-210 MAIN STATION: PARTS LISTING

Part number	Description	qty
180000	Filter Choke	1
210013	Headset Connector, 4-pin XLR male	2
210121	Connector Panel Mount, male	7
210122	Connector Panel Mount, female	1
240010	Rubber foot, 1/2" square	4
240014	Volume knob, 3/4" wide	1
240015	Volume knob, 1/2" wide	1
240032	Carry Strap, 8" brown w/ hardware	1
250219	CS-210 chassis	1
250220	CS-210 chassis cover	1
390010	LED, red, panel-mount	1
510002	Power Switch, rocker, illumin.	1
510006	Toggle Switch, mini	1
510012	Pushbutton, momentary	2
510053	Slide Switch (line voltage select)	1
510065	Slide Switch (program assign)	1
510066	Slide Switch (mic on/off)	1
520025	Fuse, .5 amp slow-blow	1
520027	Fuseholder	1
520029	Circuit breaker, .9 amp	1
610000	Power cord, 3-conductor	1
640000	Strain relief for power cord	1
710154	CS-210 printed circuit board assy.	1
810009	CS-210 Operation & Service manual	
820020	(optional) CS-210 Rack-Mount Kit	


CS-210 SYSTEM SCHEM.
CS-210-SSD-D
UNLESS NOTED: ALL RESISTORS IN OHMS 5% 1/4W
ALL CAPACITORS IN MICROFARADS
ALL DIODES 1N4148 OR EQUIV
ASY 710154